

Ampex 7500  
Ampex 4900  
Ampex VR-660 Recollections of Jim Wheeler  
Chronology by Howard Sanner



Ampex VP 4900



Ampex VPR 5800

### **Ampex 7500**

This deck is capable of recording and playing both low and high band, and is capable of a full 4.2 MHz video bandwidth. This is the first color-capable type A VTR, but it required specially modified monitors that could accept an external subcarrier reference. It was described as a portable, transistorized VTR capable of recording and playing back both B/W and color video signals. Two audio channels could be recorded from microphones or other audio sources. It is

was used in closed circuit applications in the medical, educational, industrial, sports and entertainment fields.

### **Ampex VP 4900**

This machine was designed specifically for in education, industry, government, and medicine, with a video response of 3 Mhz and a horizontal resolution of 300 lines. The video signal to noise ratio is 42 dB. A rotary transformer in the drum assembly provided increased reliability of signal transmission from the head, according to the company. Fast forward and rewind speed were each four minutes.

### **Jim Wheeler**

Ampex VR-660 videotape recorder

Subject: Re: [AMIA-L] In-Flight Video

Date: Wed, 9 Oct 2002 21:25:23 EDT

From: Jim Wheeler <[Jimwheeler@AOL.COM](mailto:Jimwheeler@AOL.COM)>

Reply-To: Association of Moving Image Archivists <[AMIA-L@LSV.UKY.EDU](mailto:AMIA-L@LSV.UKY.EDU)>

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Jeff

In 1964, TWA had a corner on In-Flight movies. The CEO of Continental Called the Ampex VP of Engineering and asked if we could develop a videotape system for showing movies. The VP set down with me and we had a plan roughed out within an hour of the phone call from Continental. The VP wanted a single large monitor in each cabin--just like the TWA system. I argued for individual monitors. We ended up with a compromise--which is what is common today.

I built a small box that converted the 28 volts DC aircraft power to 110 volts AC. This was the power source for the VR-660 helical videotape recorder. Ampex bought several hundred small TV monitors that would be mounted every other seat and on both the left and the right walls of the airplane. The wiring and monitors were installed by a company that did a poor job. There was crosstalk and RFI problems. Before this happened, I was transferred to another Division of Ampex in another town and never did hear how the crosstalk was handled.

I suspect that fiber-optic cables are used in today's In-Flight video Systems so crosstalk is not an issue.

Another version of "In-Flight" video was developed by the U.S. military. The U.S. Air Force installed a VR-660 in the tail area of every B-52 used in the Vietnam war. It was connected to a video camera that was pointed down. When a B-52 left Guam for a bombing run, the record button was activated. The VR-660 would record for six hours. Most of the recording was over water but it also showed what was actually bombed.

This is a good example of where archiving the entire 6 hour tape is not desired. 5 hours of ocean is very boring to watch.

Jim

## **Chronology of Ampex Professional Products**

(Draft: 29 Oct 95; Rev. 4 Nov 99)

Compiled by Howard Sanner

### Introduction

The source for this chronology of Ampex professional audio and video products is principally the Ampex Fact Book prepared by Ampex in 1970 to celebrate the company's 25th anniversary. All dates not in square brackets are from this document, as are all quotations unless otherwise noted. Any dates given in square brackets are from another source, often the date on a manual in my collection. Additional sources I have found helpful are a chronology prepared by David Dintenfass, anecdotes about the Ampex 200A by Larry Racies, and comments on the MR-70 by Bill Vermillion. My thanks also to Russ Bleakley and, indirectly, John G. McKnight, for sending me the Fact Book. I have also included other significant events in the company's history. I drew the line at instrumentation recorders, computer equipment, consumer audio gear, and the like.

An overall chronology is first, followed by a discussion, in chronological order, of some models of audio recorders.

### Chronology

1944 Nov. 1: Company founded as Ampex Electric and Manufacturing Company. The name Ampex is derived from the initials of the company's founder, Alexander M. Poniatoff, plus "ex" for excellence. [This is the party line. An insider once told me that the "ex" actually stood for "experimental."]

1946 May 2: Incorporated in California as Ampex Electric Corporation.

1947 Oct. 1: Model 200A audio recorder demonstrated at Radio Center, Hollywood, Calif.

1948 Apr. 24: First production model 200A recorders delivered to ABC and placed in service Apr. 25 across the country. First regular professional use of magnetic recording. [The Germans don't count, I guess.--hcs]

1949 May: Model 300 audio recorder. It "provided improvements in head design, drive system and tape path." [Cf. date in Lindsay article, cited below.] July: Model 300 production begins (Harold Lindsay, "Magnetic Recording, Part II," db, Jan. 1978: 41). [Cf. date in Fact Book, cited above.] Lindsay, op. cit., 42, says the 400 was first manufactured "late in 1949."

1950 Fall: Model 400 audio recorder. This was "lower priced," "of professional quality," and "developed specifically for independent broadcast stations."

1953 Apr.: Model 350 audio recorder replaced the model 400. "The model 350's simplicity, improved tape drive system, durability and performance established a new standard of excellence for the broadcast industry." May 1 [per p. 1] or July 2 [per p. 43]: Name Ampex Corporation adopted. September: Entered motion picture field with sound equipment for Cinemascope.

1954 May: Model 600 portable recorder for field use. It "retained full master quality in a highly compact form." [No date given]: Models 3200-3300 high-speed duplicators.

1956 Apr.: Demonstrated model VR-1000, the first video tape recorder at NAB convention in Chicago. Nov. 30: First coast-to-coast network TV broadcast using an Ampex video recorder was "Doug Edwards and the News" on CBS.

1956 Mar.: Ampex wins Emmy for VR-1000.

1958 Model 351 audio recorder. [A flyer in my collection copyrighted 1962 refers to the 351's "four-year history of dependable operation by more than 9,000 units."--hcs] Apr.: Color video tape recorder. [No model no. given in Fact Book.] First demonstration of video tape editing.

1959 Jan. 19: Ampex stock listed on N.Y. and Pacific Stock Exchanges. June: United Stereo Tapes formed to record, make, and distribute stereo music tapes for home use. October: Orr Industries, Opelika, Ala., merged into Ampex Corp. and became the Ampex Magnetic Tape Division.

1960 [specific date not known]: MX-35 four channel stereo mixer. [My copy of the manual is dated Sept. 1960.--hcs] Jan.: Model 970, a self-contained portable stereo recorder. It had a built-in stereo amplifier and speaker system for monitoring purposes. Apr.: Model 354 audio recorder, "designed specifically for recording and reproducing stereophonic sound." Apr.: VR-1001A video tape recorder, an upright model, introduced.

1961 Jan.: VR-8000, a closed-circuit video tape recorder for education and training applications. Apr.: Awarded Oscar for "development of an advanced multipurpose theater sound system." Dec.: 40 acres purchased in Redwood City, Calif., for a new corporate headquarters and research complex. Dec.: Experimental video tape recorder weighing 35 lbs. and occupying one cubic foot of space developed to record one half hour of satellite television pictures. Delivered to NASA.

1962 July 26: Ground breaking for Redwood City facility. Mar.: Ampex Electronic Editor, which allowed editing video tapes without cutting and splicing. Dec.: VR-1500 portable video tape recorder. Dec.: VR-660, a 130-lb. model priced at one-fourth the cost of previous video tape recorders.

1963 Aug. 12: Moved in to Redwood City facility.

1964 Apr.: VR-2000 high-band color and B&W video tape recorder. Apr.: MR-70 mastering audio recorder. July: United Stereo Tapes changed name to Ampex Stereo Tapes.

1965 Feb.: VR-303 closed-circuit video tape recorder. (Dropped the same year; replaced by the VR-7000.) May: AG-350, the first all-transistorized audio recorder. July: VR-660B, advanced version of VR-660; replaces VR-660/1500. Nov.: VR-7000 compact portable closed circuit video tape recorder.

1966 Jan.: AG-300 solid-state audio tape recorder. Mar.: VR-1200 high-band broadcast color and B&W video tape recorder. Mar: VR-1100E, modification of the VR-1100 for mobile use. May: VR-6000 low-cost, compact close-circuit video tape recorder. Nov. VR-6175 closed-circuit video tape recorder/TV receiver.

1967 Jan.: AG-440 series audio recorder. "It is a new generation of the 350 and 351 Series recorders, most widely used professional audio recorder/reproducers ever built." AG-445 is a playback only machine. Feb.: AG-500 series, solid state compact portable audio recorder. "An advanced generation of widely used PR-10 recorder/reproducers." Feb.: VR-7003, first closed-circuit video recorder that can record & play back at both 525-line and 625-line standards. Mar.: HS-100, high band color recording system that can do slow motion and stop action instant replays. Mar.: VR-3000, battery powered portable video tape recorder and camera combination, less than 50 lbs. Apr.: VR-7500C, first compact color video tape recorder to cost less than \$50,000. Apr.: Ampex Stereo Tapes announces it will start making cassettes. May: AL-500, long play professional logging recorder, will record more than 34 hours on a seven-inch reel. June: Second Emmy, for high band color

video tape recording. Oct.: AG-440-8, eight-channel version of AG-440. Oct.: AG-1000-24 & AG-1000-16, two new solid-state multi-channel audio recorders. [I think these were the same model later called MM1000, but cannot prove it.--hcs] Oct.: ADM-500A Duplicator Master and AD-150 Duplicator Slaves for high-speed cassette duplication. Could make ten copies of an hour long tape in two minutes. Oct.: AG-600 series, a solid-state version of the 600 series audio recorders. Oct.: AA-620, solid-state, portable 20W amp/speaker system. Oct.: AM-10, portable six-position 2 channel mixer. Nov.: VR-2000B & VR-1200B, high band color video tape recorders. Nov.: VR-5000 and VR-7800 portable video tape recorders.

1968 Apr.: VR-3000 introduced; first deliveries in May. Apr.: HS-200, color disc recording & editing system for producing commercials. Apr.: MM-1100 multi-channel audio recorders for mastering, TV, and motion pictures. June: VR-5003, international version of VR-5000. Aug.: VR-4900 and VR-5100 closed-circuit video tape recorders. Nov.: VR-7400, time lapse closed-circuit video tape recorder that can record 76 hours on a single reel.

1969 Jan.: AG-440B, an update of the AG-440. June: VP-4900C, closed circuit video tape player, priced at \$1950. July: VR-7500X, closed circuit video tape recorder with higher resolution than previously available. Sept.: MM-1005, a playback-only version of the MM-1000. [This must be what was referred to as the AG-1000 above in the entry for 1967.] Nov.: VR-1500E, lowest priced video tape recorder that allows B&W assemble editing.

[late 1973?]: MM-1100 (date from Alastair Heaslett).

[late 1974 or early 1975?]: MM-1200 (date from Alastair Heaslett).

[mid-1970s?] AG-440C.

[Spring 1976]: ATR-100 introduced at AES in Los Angeles. (Date from Alastair Heaslett, who certainly ought to know.)

[ca. 1978] ATR-700 audio tape recorder. [My copy of the ATR-700 brochure is dated 1978.--hcs]

[ca. 1983] ATR-800 audio tape recorder. [My copy of the ATR-800 brochure is dated 1983.--hcs]

## Discussion of Specific Audio Recorder Models

Note that more than one version of electronics was used by many of the tube machines.

200A: The Ur-Ampex. Earliest ones ran at 30 ips only; some later ones ran at 15 and 30 ips. Ampex made 112 of these (Harold Lindsay, "Magnetic Recording, Part II," db, Jan. 1978: 40). The 200A used oxide-out wind, like the Magnetophons. The 201 had the now-standard (except for cassettes) oxide-in wind, had 300 heads mounted in an adaptor plate, and replacement electronics configured to fit in the 200A's wire gutter. The 201 conversion kit brought the Model 200A up to the same level of performance as the Model

300. Both lacked monitor bridges, being designed with the same connectors as the monitor equipment for the then-current Scully disc recording lathes. (However, the Model 200A would accept any 600 ohm, +4 signal as input.) A real masterpiece of industrial design, hard to believe it was their first effort, rivalled in this regard only by the MR-70. No built-in microphone preamps. (Note: strictly speaking, there was no Model 200, though that is the name generally used for this model. The first Ampex was really called the Model 200A.) 300: Ran at 15/30 ips (strictly speaking, this was a Model 301) or 7.5/15 ips. Machines with serial numbers below 500 differed in many details from those that followed: top plate solenoids were AC; the top plate was plywood sandwiched between aluminum and stainless steel; there was no stiffening "banjo" under the top plate; the cabinets of the console-mounted machines looked like a miniature Model 200A cabinet. A great machine by any standard. Available up to four track on half-inch tape. It was the 300 transport that Ampex used to build up the then one-of-a-kind multi-channel recorder later sold to Les Paul. This was the standard studio mastering deck for decades. All the major studios owned them by the dozen. Most of the stereo Mercury Living Presence and RCA Living Stereo records were recorded on multi-channel Ampex 300s. Ampex made over 20,000 of these (Lindsay, op. cit., 41), including solid-state versions. The main problem with the 300 transport is its indirect capstan drive. This design did not age gracefully: absolute speed accuracy was difficult to attain and flutter increased with wear. The 300 transport was more than nineteen inches wide; it had to be mounted vertically in a standard rack. The 300 transport was also the basis for the 3200 duplicator and various instrumentation decks. 300s with "bathtub" electronics lacked built-in microphone preamps. 400 series: The worst Ampex, hands down, universally considered a catastrophe. Two motors, capstan to the left of the heads. The electronics are very similar to those of the 350.

350: A hit and, with the 351, the best of the "smaller" Ampexes. 350s had a four-pin Jones plug between the electronics and transport; the electronics had an outboard power supply and used point-to-point wiring and octal tubes. Some people think the 350 has more headroom than the 351 owing to an allegedly beefier bias oscillator. Two-track version available, but maybe not right from the start. (?) The direct capstan drive of the 350 series yielded greater absolute speed accuracy but more flutter than the

300 transport. 600/601/602: Portable tube machines, available mono or stereo. Used seven inch reels and operated at a single speed, either 3.75 or 7.5 ips (field convertible with kit available from Ampex). No tape lifters at all! 351: Transport identical to 350 (or nearly so) except that it

uses a six-pin Jones plug to connect the electronics and transport. The first Ampex to be designed as either a stereo or mono machine from the beginning.

The front panel of the electronics, of which there are several versions, is distinguishable from 350 electronics only by the black dot under the "input transfer" switch. Unlike the 350, the 351 electronics have an integral power supply, printed circuit boards, and use miniature tubes. With the 350, the nicest of the smaller tube Ampexes. The most desirable of the several versions of the electronics are P/N 02-30960.

354: Same transport as 351. Electronics have two channels crammed into one chassis, small VU meters and knobs, and a less-than-wonderful tube complement. Hard to work on because of the cramped interior space, problems with heat build up for same reason, switches aren't robust. Front panel bias and EQ adjustments. Available with the same three head configuration as the 350 and 351 or with a four head headblock, which allowed for a quarter track playback head. Sound isn't as good (in my opinion!) as the 350 or 351, but still better than most transistor (including non-Ampex) machines. Microphone preamps plugged in to octal tube sockets and usually are not present. PR-10: A small, portable machine that used seven-inch reels and 354 electronics (with a different faceplate). MR-70: Without any argument the best tube Ampex ever made, probably the best analog tape deck ever made, period. This machine was an all-out effort to make a cost-is-no-object, state of the art recorder. According to a 1966 GSA price schedule in my collection, a two-track, quarter-inch MR-70 in console cost \$5456.25 and an identically configured AG-300 cost \$3496.00. Transport is similar to the 300, but considerably beefed up. Nuistor electronics. Custom-wound transformers, metal film resistors, film capacitors, etc., etc. Available in many track configurations, up to eight tracks on one-inch tape, and speed pairs of 7.5/15 ips or 15/30 ips. Some track configurations (e.g., two track on half inch tape) anticipate today's preferred analog formats; some configurations were available only on special order. It and the much-despised Model 400 series were the only Ampexes before the ATR-100 to have constant tension. Completely mu-metal shielded. Motor drive to reel idler for faster starts. Allegedly fewer than 100 made. Parts not shared with the 300 are scarce to the point of being impossible to get. According to Bill Vermillion, a Studer engineer once told him that Willi Studer's goal in life was to make a tape recorder better than the MR-70. He tried for two decades; then came to the conclusion that he could equal it but not surpass it. All-in-all, a fantastically elegant piece of industrial design. See Rein Narma and Mort Fujii, "Performance and Reliability Requirements for a Master Tape Recorder," *Journal of the Audio Engineering Society*, v. 12, no. 4 (Oct. 1964): 274-279 for a full discussion of the rationale behind the MR-70's design. Microphone preamps plugged in to octal tube sockets and usually are not present.

AG-350: The first transistor Ampex. Transport design essentially unchanged from the 350/351/354. Faceplate and control panel redesigned to conform to the "new" corporate look of the MR-70 and later AG-440. Eight conductor Jones plug interconnecting the transport and electronics. Speed change on the transport now changes EQ automatically. Available with either the three or four head headstack, like the 354. Locking level controls for record and reproduce, as on the MR-70. Ampex offered a kit to upgrade tube 350 series machines to use AG-350 electronics. No built-in microphone preamps.

AG-300: Facelifted 300 transport, as for AG-350, with AG-350 electronics. No built-in microphone preamps. MM-1000, MM-1100, MM-1200: Multi-channel mastering machines using AG-440 electronics. MM-1000 transport based on the VR-1000 video transport. Available with up to 24 channels. No built-in microphone preamps.

AG-440: The workhorse of the transistor Ampexes. Available in versions up to eight track on one-inch tape. Synchronous or servo capstan motor. No built-in microphone preamps.

ATR-100: An MR-70 for the 1970s and beyond. The only analog machine in the MR-70's league. This machine took fourteen-inch reels and could be field adjusted to operate at any two speeds from 3.75 ips through 30 ips (note: speeds do not have to be adjacent). Specifications are at least an order of magnitude better than any other analog tape deck and in many areas rival those quoted for digital. Available up to 24 track on two-inch tape. Later examples were assembled in Mexico. No built-in microphone preamps. AG-500: Solid-state version of the PR-10.

AG-600: Transistor update of 600/601/602 decks. ATR-700: According to Mike Rivers approximately a TEAC 7030 with different buttons and low impedance mike inputs. The same guts appeared as the Tascam 25-2. Not a "real" Ampex, and not very desirable.

ATR-800: The last of the Mohicans. Made in Japan by Tascam but an Ampex design.

Sic transit gloria Ampex.